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Gillis

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[54] **WATER SKIBOARD WITH ROTATABLE BINDING**

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[*] Notice: The portion of the term of this patent subsequent to Jan. 11, 2011 has been disclaimed.

[21] Appl. No.: **167,637**

[22] Filed: **Dec. 14, 1993**

Related U.S. Application Data

[63] Continuation of Ser. No. 810,817, Dec. 19, 1991, Pat. No. 5,277,635.

[51] **Int. Cl.**[6] **A63C 9/08**

[52] **U.S. Cl.** **441/74;** 441/68

[58] **Field of Search** ..... 280/617, 618, 607, 613, 280/633; 441/65, 67, 68, 70, 74, 75; 114/39.2; 248/503.1; 24/70 SK

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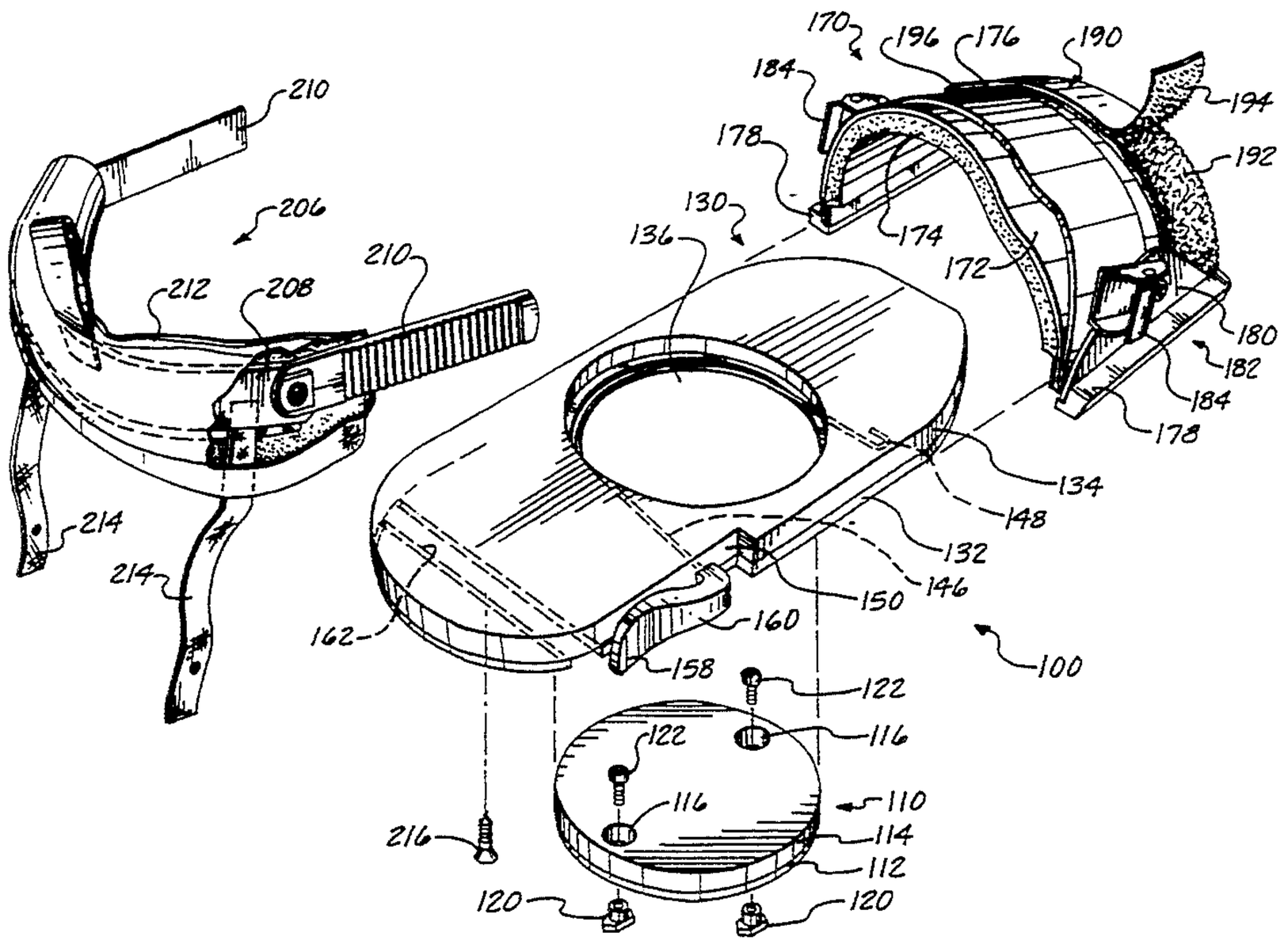
[57] **ABSTRACT**

A skiboard system comprising a skiboard having a channel extending along a portion of the length thereof and two bindings secured, via the channel, to the skiboard. The bindings are design to be rotated between a locked starting position, where the long axes of the bindings extend parallel to the long axis of the skiboard, and a locked skiing position, where the long axes of the bindings extend transversely to the long axis of the skiboard. After the bindings have been rotated to a selected position, the bindings are secured in place via a locking mechanism that is operated by movement of a pivotally mounted handle. In addition, the bindings include a resilient front strap assembly and a resilient heel support for securing the user's feet to the binding while at the same time permitting a user to quickly and easily remove his or her feet from the bindings in the event of a fall.

2 Claims, 4 Drawing Sheets



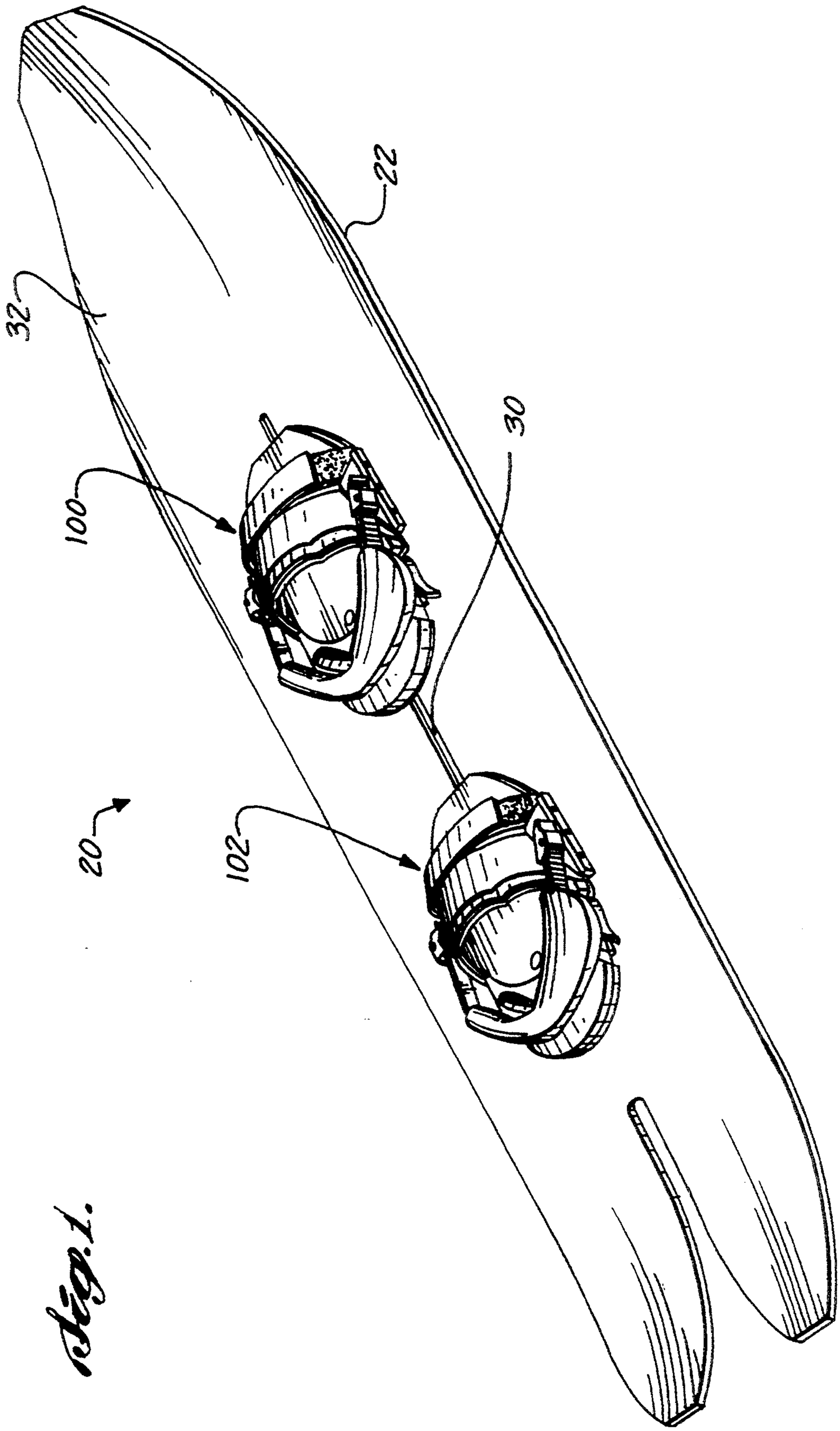


Fig. 1.

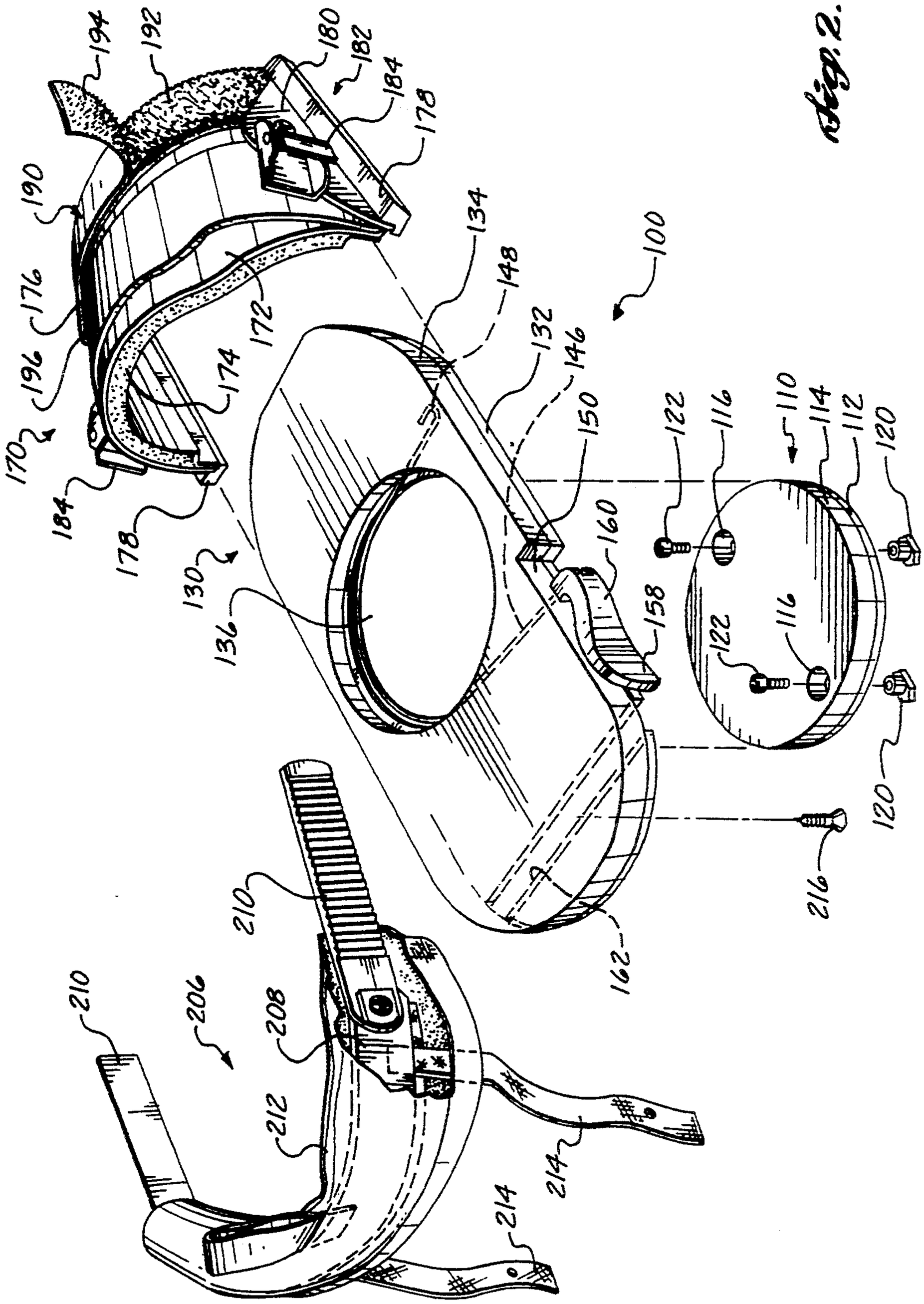

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Fig. 2.

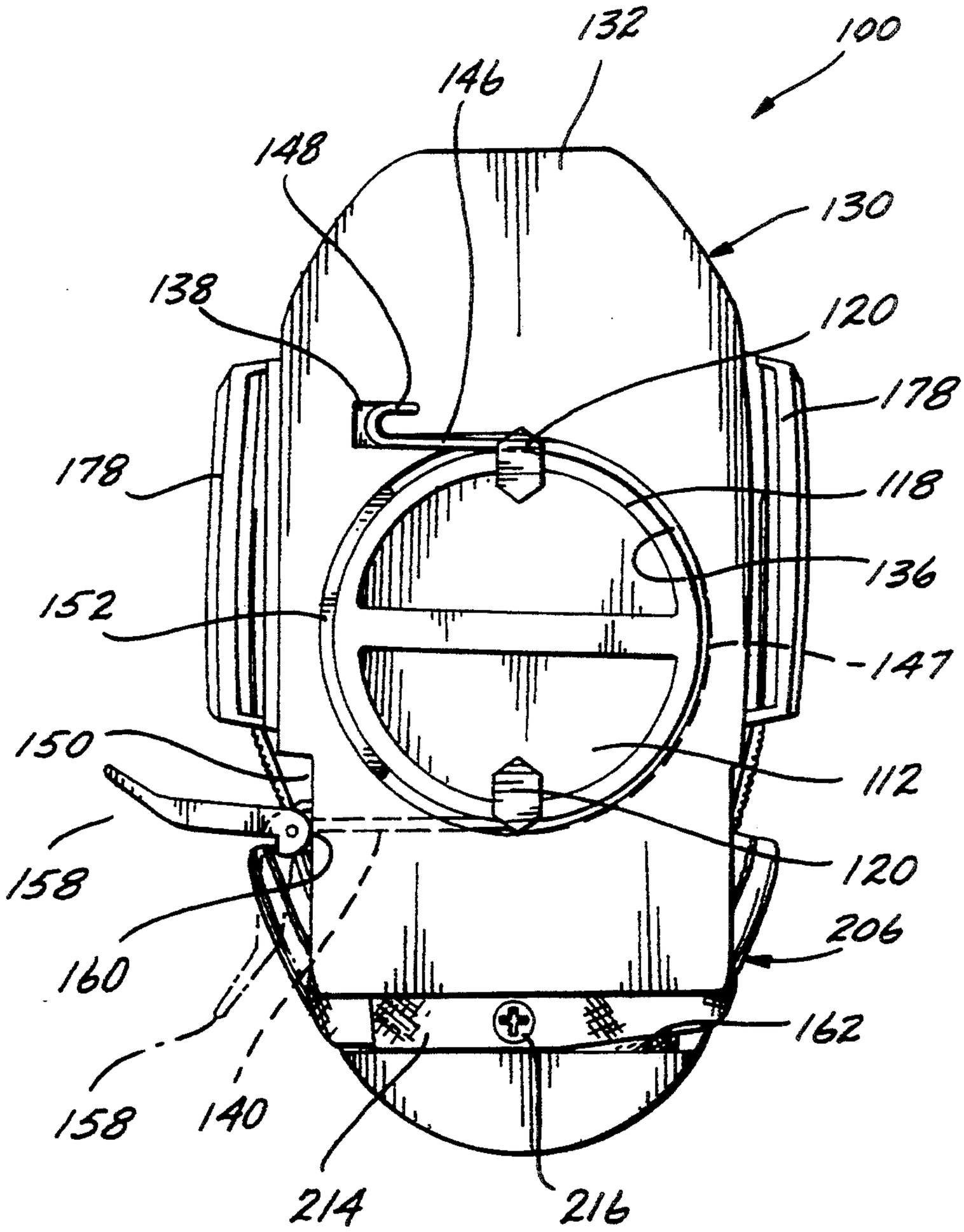
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Fig. 3.

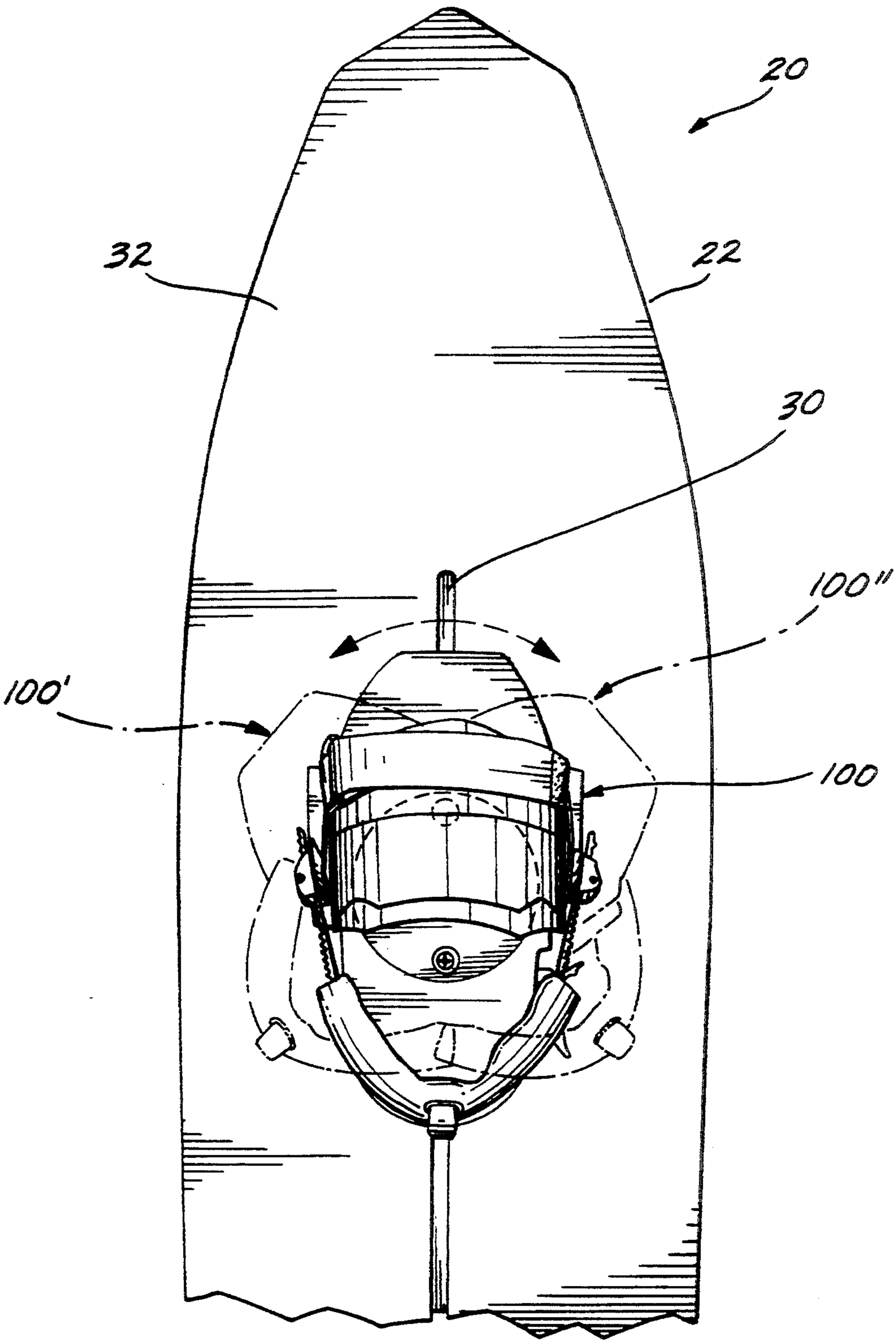

Fig. 4.

WATER SKIBOARD WITH ROTATABLE BINDING

CROSS-REFERENCE

This application is a continuation of application Ser. No. 07/810,817, filed on Dec. 19, 1991, titled "Water Skiboard With Rotatable Binding," now U.S. Pat. No. 5,277,635.

FIELD OF THE INVENTION

The present invention pertains to water skiboards and bindings used therewith, and more particularly to a water skiboard binding system including a rotatable binding.

BACKGROUND OF THE INVENTION

Water skiboards ("skiboards") are a relatively new recreational product related to slalom water skis. A skiboard is typically, although not always, wider and shorter than a slalom water ski that a person of given weight and ability would use. In addition, the bindings on a skiboard are mounted such that the user's feet are positioned side by side, at an angle to the long dimension of the skiboard. By contrast, with a slalom water ski the bindings are positioned one in front of the other, so that the skier's feet extend parallel to the long dimension of the ski.

Because the bindings on known skiboards are mounted at an angle to the long dimension thereof, it tends to be difficult for a skiboard user to get up from a starting position in the water to the standing position the user assumes when the skiboard is pulled across the surface of the water. Currently, a skiboard user must either (a) position the skiboard so that its long axis is parallel to the direction of travel of the power boat used to pull the skiboard and user, and then position his or her body at an angle to the direction of travel, or (b) position his or her body so as to face the boat and position the skiboard at an angle to the direction of travel. In either case, it tends to be difficult to get started, with the result that less athletic persons or persons lacking the time to perfect using a skiboard often give up before attaining proficiency. In some cases, the problems associated with "getting up" on a skiboard are enough to prevent certain individuals from even trying to ski with a skiboard. Such problems do not exist with a slalom water ski because the bindings are mounted such that the long axis of the ski and the front of the user's body may be positioned in the direction of travel of the power boat used to pull the skiboard and user.

In the field of snowboarding, bindings have been developed that permit a snowboard user to adjust the rotational orientation of the bindings on the snowboard. One such binding is sold by the French company Look. The Look binding includes (1) a circular plate that is attached to the snowboard via fasteners, e.g., screws, engaged with the snowboard and (2) a footbed having a central aperture for rotatably receiving the circular plate. A lock assembly is provided for locking the footbed in predetermined rotational position with respect to the circular plate. A housing, including one or more fasteners, is attached to the footbed for securing a user's boot to the footbed such that the boot cannot be pulled free of the footbed except when the fasteners are released. Often, a user adjusts the orientation of the binding at the beginning of the season, and then no further adjustments are made.

Another snowboard with rotatably adjustable bindings is disclosed in U.S. Pat. No. 4,964,649 to Chamberlin. The Chamberlin binding is designed to permit a user to rotate the binding slightly from a preselected position by appropriate application of torque applied via the user's boots to the binding. When such torque is no longer applied, elastomeric structure in the binding causes the binding to return to the preselected position. The Chamberlin binding is not designed to permit a user to rotate the binding to a selected position during use of the associated snowboard and then lock the binding in place.

An adjustable binding designed for use with a water skiboard is disclosed in Harris U.S. Pat. No. 4,871,337. The Harris binding includes a foot plate that rests on the top surface of the skiboard and a strap attached to the plate for securing a user's foot to the plate. The plate is attached by two clamp assemblies to an elongated channel extending lengthwise of the skiboard. The clamp assemblies permit the user to secure the bindings at selected locations along the length of the channel. The clamp assemblies include set screws extending through arcuate slots in the foot plates to allow limited adjustment of the angular positions of the foot plates relative to the length of the skiboard. The range of rotation of each foot plate is limited to the normal riding positions, i.e., in the most forward rotated position of each foot plate it extends at an angle of about 45° to the length of the board. Furthermore, two set screws must be loosened before the foot plate can be repositioned, and must be tightened to secure the foot plate in place and, when the clamp assemblies are loosened to permit the bindings to be rotated to a new position, the bindings are also free to move along the length of the skiboard. Such longitudinal movement of the bindings is undesirable when only rotational repositioning is desired. The Harris construction is not adapted for convenient adjustment of the rotational position of water skiboard bindings during use of the skiboard.

SUMMARY OF THE INVENTION

The present invention is a skiboard system comprising a skiboard and a pair of rotatable bindings designed for use therewith. The skiboard has a top surface and an attachment member, e.g., a C-shaped channel opening through the top surface of the skiboard and extending along at least a portion of the length of the skiboard. Each of the bindings includes a base and a retention assembly coupled to the base for securing a user's bare foot in firm engagement with the base and for permitting the foot to be disengaged from the base solely by pulling the foot away from the base with a predetermined force. Each of the bindings also includes a mounting assembly coupled to the base and designed to be releasably secured to the attachment member at a selected location along the length thereof, for attaching the base to the skiboard so as to permit the base to be freely rotated about an axis intersecting the base and extending substantially normal to the top surface of the skiboard while preventing the base from moving along the length of the skiboard. Additionally, each of the bindings includes a lock assembly attached to the mounting assembly and including an actuation member movable between locked and unlocked positions. The lock assembly is designed to secure the base to the mounting assembly in a selected rotational position with respect to the axis extending normal to the top surface of the skiboard when the actuation member is in the

locked position and to permit the base to be rotated relative to the mounting assembly about the axis when the actuation member is in the unlocked position. The lock assembly is designed to be quickly and easily operated during use of the skiboard system.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing aspects and many of the attendant advantages of this invention will become more readily appreciated as the same becomes better understood by reference to the following detailed description, when taken in conjunction with the accompanying drawings, wherein:

FIG. **1** is a perspective view of the skiboard system of the present invention, including a skiboard and bindings selectively rotatable relative thereto;

FIG. **2** is an exploded perspective view of one of the bindings of the skiboard system illustrated in FIG. **1**;

FIG. **3** is a bottom view of one of the bindings of the skiboard system illustrated in FIG. **1**; and

FIG. **4** is a top view of the front portion of the skiboard system illustrated in FIG. **1**, with the binding being illustrated in solid lines with its long axis extending parallel to the long axis of the skiboard and with the binding being illustrated in phantom in different orientations.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIG. **1**, the present invention is a skiboard system **20** comprising a water skiboard **22** and rotatable bindings **100** and **102**.

Skiboard **22** is adapted to ride on the water, having a similar size, shape and construction to that of known skiboards. Skiboard **22** includes an elongate channel **30** extending along at least a portion of the length of the skiboard. Channel **30** is preferably centered relative to the width of skiboard **22**. Channel **30** preferably has a C-shaped cross-sectional configuration, with the open portion of the "C" opening through the top surface **32** of skiboard **22**. In one embodiment of the invention, channel **30** has a depth of about 1 cm and a width, at top surface **32** of skiboard **22**, of about 1 cm. This channel **30** also has an interior width of about 2 cm, as measured at its greatest interior width dimension. Other channel configurations may also be satisfactorily employed.

Bindings **100** and **102** are identical. Thus, the following description of binding **100** also applies to binding **102**.

As best seen in FIG. **2**, binding **100** comprises a circular baseplate **110** made up of a bottom portion **112** and an upper portion **114**. Bottom portion **112** is preferably made from a rigid, noncompressible material such as glass-filled nylon. Upper portion **114** is preferably made from a soft resilient material such as EVA closed-cell foam. Bottom portion **112** and upper portion **114** have identical diameters at their mating plane and are bonded together using an appropriate adhesive or other fastener. In one embodiment of binding **100**, baseplate **110** has a diameter of about 12 cm. A pair of diametrically opposed, countersunk holes **116** are provided adjacent the periphery of circular plate **110**. As illustrated in FIG. **3**, bottom portion **112** includes a downward projecting annular lip **118**. The outside diameter of lip **118** is somewhat less than that of the upper part of portion **112** from which the lip extends.

Returning to FIG. **2**, circular plate **110** may be secured to skiboard **22** at a selected location along the length of channel **30** using screws **122** extending through the holes **116** and t nuts **120** received in the central channel of the skiboard. The heads of t nuts **120** are sized and configured so that in one position the heads may be inserted in the skiboard channel and, in a second position rotatably disposed 90° from the first position, the heads will bridge across the top opening of the channel so as to prevent the nuts from being removed therefrom. The circular plate **110** is firmly secured to the skiboard at a selected location along the length of the channel by tightening the screws **122**.

Binding **100** also includes a footbed **130**. Like the circular baseplate **110**, footbed **130** features a two-part construction consisting of bottom layer **132** and upper layer **134**. In one embodiment of the present invention, footbed **130** is sized to support a wide range of foot sizes, with the footbed having a width of about 13 cm and a length of about 29 cm. Bottom layer **132** is typically made from the same material used to make bottom portion **112** of circular plate **110**, i.e., a rigid, noncompressible material such as glass-filled nylon. Similarly, upper layer **134** is typically made from the same material as upper portion **114** of circular plate **110**, e.g., EVA closed-cell foam. An appropriate adhesive or fastener is used to secure upper layer **134** to bottom layer **132**.

The interconnection of the footbed **130** to the circular plate **110** is essentially the same as the system used in the snowboard manufactured by the French company Look referred to in the "Background of the Invention" section above. Footbed **130** includes a circular aperture **136** extending therethrough. Aperture **136** is sized to receive circular plate **110** with a close-sliding rotatable fit. As best illustrated in FIG. **3**, bottom layer **132** includes a groove **138** opening out to the bottom surface of the bottom layer, with one end of the groove having a U-shaped configuration and the other end of the groove intersecting and terminating at aperture **136**. Bottom layer **132** also includes a bore **140** (FIG. **3**) coupling the circular aperture **136** with outer edge **150** of the bottom layer. A wire or band **146** having a curved central portion **147** (FIG. **3**) is received in circular aperture **136**. Wire **146** includes a hooked end **148** positioned in the U-shaped portion of groove **138** and a straight end positioned in bore **140** and sized to extend beyond side edge **150** of bottom layer **132**.

When circular plate **110** is inserted in aperture **136**, wire **146** will engage and wrap around a portion of the projecting annular lip **118**, as best illustrated in FIG. **3**.

Footbed **130** also includes a curved friction plate **152** secured to the peripheral wall of aperture **136** opposite the portion of projecting annular section **118** along which the curved portion **147** of wire **146** extends. As in the Look snowboard construction, a handle **158** having a curved cam surface **160** is pivotally attached to the end of wire **146** that projects outwardly of edge **150** of bottom layer **132** so as to be movable between a locked position (illustrated in phantom in FIG. **3**) and an unlocked position (illustrated in solid lines in FIG. **3**). Preferably, handle **158** has a length of at least about 4 cm so as to provide sufficient mechanical advantage to permit a user to move that handle easily between the locked and unlocked positions, as described in more detail hereinafter. Plate **152** is sized to slidingly engage annular section **118** when handle **158** is in the unlocked position and to tightly engage section **118** when handle **158** is in the locked position, as discussed in more detail hereinafter.

Bottom layer **132** includes a groove **162** (FIG. **3**) that extends across the width of the rear portion of the bottom layer and opens outwardly to the bottom surface thereof.

As best illustrated in FIG. **2**, binding **100** includes a front portion **170** for releasably securing the front portion of a user's foot to footbed **130**. Front portion **170** includes a resilient strap or toe piece **172** sized to extend from one edge of footbed **130**, across the arch and front portion of a user's foot, to an opposite side of the footbed. In one embodiment of the invention, resilient strap **172** is made from a neoprene sheet having a width of about 11 cm and a thickness of about 4 millimeters. Preferably, resilient strap **172** is lined with a layer of cushioning material **174** made, for instance, from closed-cell foam. A layer of elastic material **176** extends over, but is not attached to resilient strap **172**. Layer **176** has an elasticity somewhat less than that of resilient strap **172**.

The opposite side edges of resilient strap **172**, cushioning layer **174** and resilient layer **176** are secured via fasteners (not shown), e.g., screws, to elongate members **178**. Such fasteners extend through the elongate members **178**, the bottom edges of straps and layers **172–176** and into bottom layer **132** of footbed **130**.

A rigid plate **180** is interposed between elongate member **178** and the bottom edges of straps and layers **172–176** and is secured to bottom layer **132** via the fasteners used to secure straps and layers **172–176** to the bottom layer. A quick-release lock mechanism **182** is attached to each plate **180**, with each lock mechanism including a pivotally mounted latch **184**. The operation of lock mechanism **182** is described in more detail in connection with the description of heel support **206**.

Front portion **170** also includes a two-part strap **190** made from a relatively inflexible material, e.g., nylon webbing. Strap **190** includes a first end portion **192**, one surface of which is covered with loop fastening material, and a second or free end portion **194** having hook fastening material covering one surface thereof. Portion **192** extends across, but is not secured to, the front portion of resilient strap **172**. One end of portion **192** is secured to the edge of footbed **130** via member **178** and the fasteners extending therethrough. The opposite end of portion **192** extends through a rigid oval ring member **196**. Ring member **196** is attached to the opposite side of footbed **130** via a strap (not shown) secured via the associated elongate member **178** to bottom layer **132**. Portion **194** extends from the ring member back across portion **192** such that the hook material on portion **194** engages the loop material on portion **192**, thereby releasably securing portion **192** to portion **194**.

Binding **100** additionally comprises heel support **206** for urging the back portion of a user's foot toward front portion **170** and for preventing the back portion from rising up from footbed **130**. Heel support **206** comprises a heel strap **208** made from a resilient material such as neoprene. A rigid engagement strap **210** is attached to each end of heel strap **208**. Each strap **210** is designed to be received in and releasably secured to an associated lock mechanism **182**, as discussed in greater detail hereinafter. Although the specific design of strap **210** and locking mechanism **182** may vary, these elements should be constructed so as to permit the ends of heel strap **208** to be releasably secured to, and selectively positioned with respect to, front portion **170**. Strap **210** and locking mechanism **182** may, for example, be designed in accordance with the invention disclosed in U.S. Pat. No. 3,662,435.

Preferably, heel strap **208** and a portion of that end of each strap **210** secured to the heel strap is received within a fabric sleeve **212**. Sleeve **212**, and hence heel strap **208** received therein, is attached in spaced relation to bottom layer **132** of footbed **130** via straps **214**. Straps **214** are received in groove **162** in bottom layer **132** and are secured in place via screw **216**. The length of straps **214** is selected so that when heel support **206** is pulled up such that the straps are fully tensioned, heel strap **208** will be positioned just above the heel of, and will extend across the Achilles tendon of, a foot properly positioned on footbed **130**.

In connection with the following discussion of the use and operation of skiboard system **20**, reference should be made to FIGS. **1–4**. Assuming bindings **100** and **102** are fully assembled, as illustrated in FIGS. **1** and **4**, bindings **100** and **102** are first secured at selected locations along the length of channel **30** by positioning bindings **100** and **102**, and by adjusting the associated nuts **120**, such that the heads of the nuts may be inserted into channel **30**. Then, nuts **120** are rotated 90° and screws **122** are tightened so as to draw the heads of the nuts upwardly into tight frictional engagement with the upper walls of channel **30**, thereby securing the circular plates **110** of bindings **100** and **102** to skiboard **22**. The precise placement of bindings **100** and **102** along the length of skiboard **22** will vary as a function of the size, ability, and stance preference of the user. Often, the longitudinal placement of bindings **100** and **102** is selected at the beginning of the season and has not changed for the remainder of the season.

Prior to using skiboard system **20** on the water, a user next adjusts front portion **170** and heel support **206** on each of the bindings **100** and **102** so that the user's feet are snugly, yet releasably, secured to the footbed of the bindings. To perform this adjustment, the user inserts his or her foot under front portion **170**, pulls the hook portion **194** of strap **190** away from loop portion **192** and tightens strap **190** an appropriate amount by pulling on hook portion **194**. Then, to lock strap **190** at the selected level of tightness, hook portion **194** is pressed against loop portion **192**. When properly adjusted, strap **190** limits the elastic expansion of resilient strap **172**, thereby limiting the forward movement of the foot within the binding **100** or **102**. Elastic layer **176**, which, as noted above, is somewhat less elastic than strap **172**, further limits forward and upward movement of a foot positioned under front portion **170**. Typically, the user has bare feet, although in some instances a user may wear a thin "soft bootie" or other thin, flexible sock-like foot apparel.

Next, heel support **206** is moved toward or away from front portion **170**, based on the size of the user's foot, so that the foot is urged forwardly against front portion **170**. Such adjustment of heel support **206** is achieved by releasing the latches **184** of lock mechanisms **182** and then moving the associated straps **210** received within the locking mechanism back or forth, as required. When appropriate placement is achieved, the latch **184** is released, thereby locking the straps **210** in selected position with respect to the locking mechanism.

Bindings **100** and **102** are then rotatably adjusted so that the long axis of the bindings extend parallel to the long axis of skiboard **22**, as illustrated in FIG. **1**. Such adjustment is achieved by first moving handle **158** to the

unlocked position, as shown in solid line in FIG. 3. Such adjustment of handle **158** reduces the length of the end of wire **146** that projects outwardly from bore **140** past edge **150** of bottom layer **132**. By reducing the length of wire **146** projecting outwardly past edge **150**, the force with which wire **146** drives projecting annular section **118** against friction plate **152** is reduced. Such reduction in force, permits circular plate **110** to rotate relatively freely within aperture **136**. In this regard, wire **146** is sized so that when handle **158** is in the locked position illustrated in phantom view in FIG. **3**, thereby increasing the length of wire **146** projecting outwardly past edge **150**, the length of wire surrounding projecting annular section **118** is reduced an amount sufficient to drive annular section **118** against friction plate **152** with a force sufficient to prevent the annular section, and, hence, circular plate **110**, from rotating within aperture **136**. Cam surface **160** on handle **158** provides a mechanical advantage that facilitates the tensioning and untensioning of wire **146**. Assuming bindings **100** and **102** are positioned in the manner illustrated in FIG. **1**, handle **158** on each of the bindings is then moved to the locked position, thereby preventing the bindings from rotating with respect to skiboard **22**.

Upon completion of the adjustment and placement of bindings **100** and **102**, as described above, skiboard system **20** is ready for use on water. A user starts skiing with skiboard system **20** in substantially the same way a skier starts water skiing with a slalom water ski. Thus, with skiboard system **20**, a user positions the ski so that its long axis extends parallel to the direction of travel of the power boat used to pull the skiboard, with the user's body being aligned with and facing the power boat. This starting position is significantly different from the starting position a user assumes when starting to ski with a conventional skiboard in which the bindings are rigidly attached at an angle to the long axis of the skiboard. As noted above, in the latter case, the user either aligns the skiboard with the direction of travel of the boat and positions his or her body off to one side, or positions his or her body in alignment with the path of the boat and positions the skiboard at an angle to the direction of travel of the boat.

After the power boat has pulled the skiboard and user out of the water such that the skiboard is traveling along the top surface of the water, the user then adjusts bindings **100** and **102** so that the long axes of the bindings extend transversely to the long axis of skiboard **22**, i.e., in a binding position similar to that used on prior art skiboards. The user achieves such adjustment by bending down and manually moving handle **158** on one of bindings **100** and **102** to the unlocked position, rotating the binding with his or her foot to the desired transversely extending position, and then moving the handle back to the locked position, thereby securing the binding in place. A similar adjustment is then made to the other binding. As a consequence of the length of handle **158**, the use of cam surface **160** on the handle, and other design features of the various elements for releasably securing circular plate **110** to footbed **130**, discussed above, a user can easily and quickly move handle **158** between the locked and unlocked positions.

Such adjustment of bindings **100** and **102** is illustrated in FIG. **4** with respect to binding **100**. In the starting position, binding **100** is oriented in the position illustrated in solid view. After "getting up," a user preferring a "right foot first" stance would then adjust binding **100** to the positioned illustrated in phantom view and identified by **100'**. A user preferring a "left foot first" stance would move binding **100** to the position illustrated in phantom view and identified by **100''**.

An important advantage of skiboard system **20** is that it permits an inexperienced and/or relatively unathletic user to use a skiboard without extensive practice and instruction. It is believed that a relatively large class of potential skiboard users have been and, but for the present invention, would be deterred from enjoying the sport of skiboarding.

Skiboard system **20** uniquely permits a user to rotatably position bindings **100** and **102** as desired during use, while at the same time permitting the user to quickly and easily remove his or her feet from the bindings in the event of a fall. Due to the relatively resilient nature of strap **172**, cushioning layer **174**, and outer elastic layer **176**, as well as the use of elastic heel strap **208** in heel support **206**, the user can easily free his or her foot from footbed **130** without the need to operate locking mechanisms **182**. Thus, in the event of a fall, a user merely pulls his or her feet away from bindings **100** and **102** with a force adequate to stretch (a) strap **172**, layer **174**, and layer **176** and/or (b) heel strap **208** such that the feet are no longer held in place by front portion **170** and heel support **206**. A typical skiboard user can easily generate such force, although in some instances the user may also want to pull heel support **206** downwardly off his or her ankle.

Certain changes may be made in the above skiboard system without departing from the scope of the invention herein involved. In this regard, although bindings **100** and **102** are preferably secured to skiboard **22** via channel **30** and nuts **120**, it is to be appreciated that the present invention encompasses alternative means for securing the bindings at selected positions along the length of the skiboard. For instance, the placement of channel **30** and nuts **120** may be reversed, with elongate channels being provided in bottom layer **132** of footbed **130** and a series of nuts **120** being secured to skiboard **22** along the length thereof. Therefore, it is intended that all matter contained in the above descriptions or shown in the accompanying drawings shall be interpreted in an illustrative and not in a limiting sense.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A water sports device for supporting a user towed behind a boat comprising an elongated board adapted to ride along the water, and binding means for restraining a foot of the user on said board in predetermined orientation relative to said board, said binding means including a rigid base member, means for mounting said base member on said board for longitudinal movement relative thereto, an elongated footbed member mounted on said base member for rotation relative to said base member for adjustment of the angular orientation of said footbed member relative to said base member and to said board, said elongated footbed member having a leading end, a trailing end, and opposite sides extending between said ends, said base member being approximately centered between said footbed member, sides and ends, and mechanical locking means for selectively stationarily securing said footbed member to said board and said base member in different rotated positions.

2. A water sports device for supporting a user towed behind a boat comprising an elongated board adapted to ride along the water, and binding means for restraining a foot of the user on said board in predetermined orien-

tation relative to said board, said binding means including a rigid base member, means for mounting said base member on said board in different longitudinal positions, an elongated footbed member mounted on said base member for rotation relative to said base member for adjustment of the angular orientation of said footbed member relative to said base member and to said board, said elongated footbed member having a leading end, a trailing end, and opposite sides extending between said ends, said base member being approximately centered between said footbed member sides and ends, and mechanical locking means for selectively stationarily securing said footbed member to said board and said base member in different rotated positions.

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